

Dr. Scott Robertson's experiments were carried out on several different farms in various parts of Essex during the years 1915-20, and were designed to test the relative fertilising value of Bessemer and open hearth basic slag, and of mineral phosphates, on permanent grassland cut for hay. The results of these experiments form one of the most important contributions which have been made in recent years to the literature of phosphatic manures, and their publication in book form is thus very welcome. It was found that on heavy soils of the London Clay and Boulder Clay the improvement effected by rock phosphates compared favourably with that due to high-soluble basic slags, especially in a wet season when the hay harvest was late, and on sour soils. The low-soluble fluorspar slags were definitely inferior, though still effecting a considerable improvement. At two of the centres where the experiments were carried out there was no response to phosphatic manuring, and the author produces evidence that this is due to the operation of another limiting factor, probably deficiency of potash. This point is of interest in connexion with the fact, well known to agriculturists, that basic slag is not invariably effective on all grassland. It is quite likely that some, at least, of these failures are due to a similar cause.

Dr. Robertson did not restrict his work to the determination of the yields of hay on his plots. He presents interesting data on the botanical composition of the herbage, and on the effect of the phosphatic manures on such soil factors as moisture content, temperature, total nitrogen and nitrate content, bacterial numbers, and acidity, all of which, together with climate conditions, are considered in relation to their possible influence on the yields obtained.

Needless to say, the book is well printed and produced, but the price is high for a small volume and will certainly react unfavourably on its sale. This is regrettable, for it deserves a wide circulation among all interested in the improvement of our grasslands and in the country's agricultural production.

H. J. P.

Our Bookshelf.

(1) *Potash*. By Sydney J. Johnstone. New edition revised and enlarged. (Imperial Institute. Monographs on Mineral Resources, with special reference to the British Empire.) Pp. x+122. (London: John Murray, 1922.) 6s. net.

(2) *Oil Shales*. By Dr. H. B. Cronshaw. (*Ibid.*) Pp. x+80. (London: John Murray, 1921.) 5s. net.

(1) MR. S. J. JOHNSTONE'S monograph on sources of potash is the most useful summary that has been produced since that written by Messrs. H. S. Gale and W. B. Hicks for the Geological Survey of the United

States ("Potash in 1917," published 1919). It has no index, but ends with an excellent bibliography, arranged in the sequence of references to the papers in the text. The author deals with all commercial sources of potash, including (p. 112) the product styled Karroo ash, a residue from the ignition of the sheep-dung used as fuel in the Karroo region of S. Africa. The attention now given to alunite is well reflected in the summaries on pp. 51 to 60. The methods of treatment are described, and it may be remembered that a research by W. T. Schaller, the mineralogist, led to the suggestion of the simultaneous extraction from alunite of potash and alumina for commercial purposes. The nomenclature in the analyses of products from the Alsatian mines on p. 12 does not agree with that adopted elsewhere in the text, and the use of "kainite," here and on p. 5, as a synonym for "sylvinite" is an obvious error. "Sylvinite" is, of course, a trade-name for a mixture of sylvine and rock-salt. It is surely time that "muriate of potash," as a name for a substance containing no potash, disappeared. On p. 5 the potassium-content of various products is given, calculated as potash, and the German and other salts are quoted as yielding 100 per cent. We believe that 12.4 per cent. was the official figure adopted by the German Potash Syndicate in 1921. The account of the occurrences of the ordinary soluble potassium salts seems the least satisfactory part of the present memoir. What, for instance, is meant (p. 11) by "the amount of potash averages 30 per cent. of potassium chloride" in the description of an Alsatian deposit?

(2) Dr. Cronshaw's review of oil-shale resources is valuable as a record of attempts to locate such shales by boring in England. Something seems to have gone astray in the account of the Ballycastle coalfield (p. 28), where the Scottish "Broxburn shale" and a place called "Newlygen" are introduced. The description of explorations and results in other countries shows how comparatively successful the industry has been in south-eastern Scotland, though even here the refineries are now to be supplied with imported oil. The author provides a good general and local bibliography.

G. A. J. C.

Town Theory and Practice. By W. R. Lethaby, G. L. Pepler, Sir T. G. Chambers, R. Unwin, and R. L. Reiss. Edited, with an Introduction, by C. B. Purdom. Pp. 139. (London: Benn Bros., Ltd., 1921.) 5s. net.

MR. PURDOM points out that, notwithstanding the frequent mention of "garden-cities" in the popular press, it is not generally understood that it is a technical term denoting a self-contained area set out upon a definite plan and including within its boundaries all the requisite elements for the life of an independent community, and that Letchworth and Welwyn alone conform to this definition. This little book on the theory and practice of the garden-city contains five essays which deal with various aspects of the question. Mr. W. R. Lethaby deals with the town itself in an essay of a general character; Mr. G. L. Pepler describes the town plan, showing how the garden-city endeavours to combine practical utility, the convenience of the workers and business undertakings, and æsthetic and hygienic considerations, and Mr. Raymond Unwin, in

discussing the best size of the town for good social life, considers, among other matters, the bearing of the number of the population upon the question of educational facilities and artistic development, such as music and the drama. Mr. Reiss raises some interesting points in connexion with land values and the possibility of co-operation with local authorities in the matter of rating and the development of municipal activities. For the use of those who wish to pursue the subject further, a bibliography is appended.

Land and Sea Speed Reckoner. Designed by Capt. W. N. McClean. (London: Constructed by C. T. Cooper and Sons, Ltd.) 1l. 12s. 6d.

THIS is an instrument of the slide-rule type, which has of late years met with considerable favour among navigators for dealing with that class of problem in which an approximate solution is sufficient. By means of the instrument it is possible to obtain (1) speed, when distance and elapsed time are known; (2) elapsed time, when speed and distance are known; (3) distance, when elapsed time and speed are known. The slide-rule consists of two scales, namely, (a) a time scale, styled the "Slider," and (b) a distance scale, and by setting these in correct mutual relation any of the above problems can be dealt with in one simple operation. Thus, if elapsed time is 8^m 40^s, while distance steamed is 3.2 miles, all that is necessary is to bring the graduations denoting these two values vertically opposite to each other, when the required speed, in this case 22.2 miles per hour, is read off on the distance scale, opposite the division on the time scale marked one hour.

A modification of the instrument, known as the "Air Speed Reckoner," has a specially adapted distance scale to meet the case of high speeds in the navigation of the air.

The manipulation of the scales is simple, and easy to grasp, and the invention seems well adapted to the purpose of dispensing with troublesome arithmetical calculations which the designer appears to have had in view.

Diet and Race: Anthropological Essays. By F. P. Armitage. Pp. vi + 144. (London: Longmans, Green and Co., 1922.) 7s. 6d. net.

MR. ARMITAGE discusses the relation of diet to stature, pigmentation, and head form. In reference to stature, after an analysis of the food values of staple articles of food in different parts of the world, he suggests that each is associated with a particular type of physique, and shows that scarcity of food is a concomitant of diminutive stature, and *vice versa*. In dealing with pigmentation, he shows that pigmentation varies with the amount of salt which enters directly or indirectly into the diet, the greatest quantity being consumed by the fairer races. The question of pigmentation is obscure, and although it is generally regarded as due to environment, it is not clear how variation has been brought about. It is not impossible that the chemical action set up by salt may be one of the factors involved. In regard to head form, the author suggests that the difference between long and broad heads may be due to the difference of muscular effort requisite in masticating soft and hard foods. The author does not appear

to be aware that a similar suggestion, both as to the effect of muscular action and as to the character of food, was put forward by Prof. Arthur Thomson some years ago.

Introduction à l'étude des fonctions elliptiques à l'usage des étudiants des facultés des sciences. Par Prof. P. Humbert. Pp. 38. (Paris: J. Hermann, 1922.) 3 francs.

ELLIPTIC functions are not studied by mathematical students unless they are specialists in mathematical analysis, yet a knowledge of the most important elementary facts about these functions is essential for advanced work in many branches of pure and applied mathematics. Prof. Humbert's object is to supply this information in a conveniently brief form. Starting with the elementary theory of residues and contour integrals, the author introduces the notion of periodic functions defined by integrals: doubly periodic functions then follow, leading to the p function and some of its most useful properties. We then get the ζ and σ functions, and finally modular functions are touched upon. The book forms a clearly written introduction which cannot but encourage the student to seek for further and more detailed information in standard treatises.

S. B.

On the Edge of the Primeval Forest: Experiences and Observations of a Doctor in Equatorial Africa. By Prof. A. Schweitzer. Translated by Ch. Th. Campion. (London: A. and C. Black, Ltd., 1922.) 6s. net.

THE author resigned his professorship in the University of Strasbourg in order to qualify in medicine with the view of working among the natives of the French Congo. His work is an account of five years' experience at Lambarene on the Ogowe River. Prof. Schweitzer is evidently a close observer, and he succeeds in giving a vivid picture of the monotony of life in the oppressive luxuriance of the tropical forest. The considerable attention devoted to medical and surgical matters does not lighten the gloom. There are a few interesting reflections on some urgent tropical problems, such as the labour question and the relation between blacks and whites, which, in view of the author's experience, might with advantages have been expanded. The book is a short one, but not without value as a contribution to the study of the negro and his relations with the trader and missionary.

Evolution of the Essex Rivers and of the Lower Thames. By Prof. J. W. Gregory. Pp. 68. (Colchester: Benham and Co., Ltd., 1922.) 2s. 6d. net.

As this book's geological contents occupy not quite sixty pages, and as "Bibliography and References" occupy three pages, and refer to fifty-nine different memoirs, or papers, on various points in Essex geology, it is obvious that no brief view of its conclusions is possible here. The views expressed as to the "Evolution of the Essex Rivers" and "The Relations of Essex and Midland River Systems," etc., are not antagonistic to those of previous writers, but are mainly occupied by matters more or less outside those treated by Essex geologists of an earlier date. In short, it is a brief work of much value to all students of Essex geology.

T. V. HOLMES.